

INCLINEO®

Operating handbook



INCLINEO®

A user's handbook

Dear Customer,

This handbook sets out to help the instrument user work through the instrument with the required ease. It is meant to be a quick learning tool that hopefully should not only make compelling reading but also provide useful guidance when employing INCLINEO®, the high precision electronic inclinometer.

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Foreword

INCLINEO® is yet another innovative product introduced to the market by PRÜFTECHNIK. It combines functions which until now were not available in one compact system with an elegant design and simplicity of use. Its ergonomic design functionality in operation together with manufacture from materials that are extremely light but able to withstand harsh operating environments makes INCLINEO® a highly accurate and easy to use measurement system. In operation the unit is able to be rotated through 360° making measurement at any angular position possible. It is operated using just 3 keys with a functional menu that offers the user all the required options for measuring profiles and determining levelness and parallelism of surfaces. The integrated Bluetooth wireless technology is used to transfer data via a flexible modern common PC software platform for processing and display. INCLINEO® is appropriate for the following applications:

- ▶ Measurement on surfaces with any inclination
- ▶ Level, flatness or parallelism of surfaces
- ▶ Angularity measurements along edges and borders
- ▶ Plumbness of vertical shafts
- ▶ Parallelism of sloping surfaces
- ▶ Perpendicularity of planes
- ▶ Ideal for installation and service

INCLINEO® is a suitable tool for most production industries.

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If you have any suggestions for improvement or corrections (not just to this manual, but also for hardware), please drop us a line. We would be glad to make improvements wherever possible.

We look forward to hearing from you.

PRÜFTECHNIK Alignment Systems
Ismaning, Germany

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INCLINEO packages

INCLINEO standard package ALI 18.000

The standard INCLINEO package ALI 18.000 constitutes the listed items:

ALI 18.201 **INCLINEO inclinometer assembly without base**

ALI 13.620 **USB RF dongle**

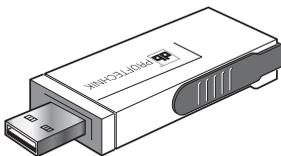
ALI 18.500 **Three point mounting base**

ALI 18.501-150 **INCLINEO grooved mounting base for smooth surfaces**

ALI 18.502-150 **INCLINEO prism-shaped mounting base for rolls and shafts**

ALI 18.200 comprises
ALI 18.201 and
ALI 18.500

ALI 13.620



ALI 18.501-150



ALI 18.502-150



0 0621 0038

Philips cross screwdriver



0 0739 1056

Allen key (3.0 mm)

0 0621 0038

90022 (4 no.)

Standard AA size batteries

ALI 18.800

INCLINEO standard case

ALI 13.700 CD

ALIGNMENT CENTER CD

ALI 9.182.G

INCLINEO pocket guide

ALI 9.183.G

INCLINEO operating instructions

ALI 9.182.G

ALI 9.183.G

0 0739 1056



90022



ALI 13.700 CD



ALI 18.800

Other INCLINEO packages

Other INCLINEO packages are listed below and details of their composition may be obtained from your local PRÜFTECHNIK Alignment Systems representative.

INCLINEO package with grooved mounting base (150 mm) ALI 18.001

INCLINEO package with prism-shaped mounting base (150 mm) ALI 18.002

INCLINEO package with three-point mounting base ALI 18.003

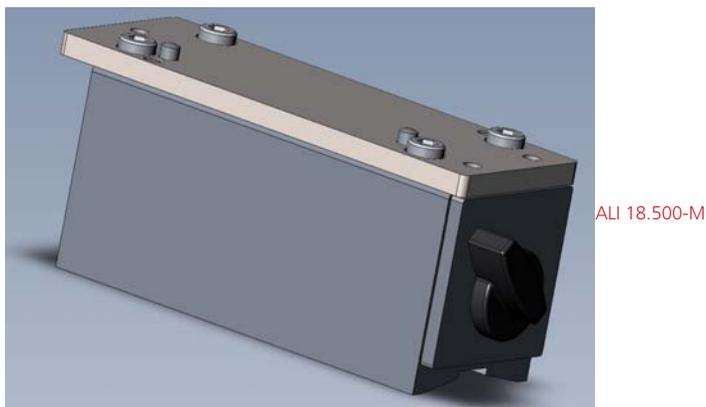
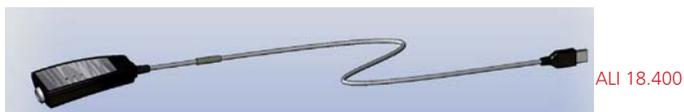
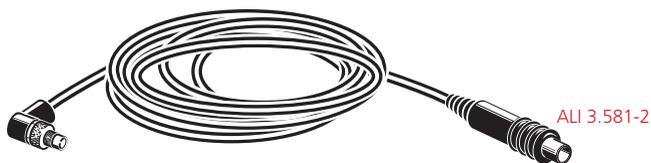
Optional INCLINEO components

ALI 18.290 INCLINEO calibration certificate

ALI 18.400 INCLINEO USB converter

ALI 18.500-M INCLINEO magnetic foot

ALI 3.581-2 Receiver cable



Safety notes

Intended use

INCLINEO is a package designed to be used in industrial environments only for measuring inclination and angularity on surfaces, rolls and shafts. Care must be taken to ensure that the system is not subjected to mechanical knocks. INCLINEO must be operated only by properly trained personnel. No liability will be assumed when components or operating procedures as described in this manual are altered without permission of the manufacturer.

Safety symbols

The following symbols are used in this manual in order to draw the reader's attention to especially important text, such as that regarding possible sources of danger or useful operating tips.

This symbol denotes general information and tips regarding operation of INCLINEO.



Note

This symbol denotes information which must be followed in order to avoid damage to equipment.



CAUTION

This symbol denotes information which must be followed in order to avoid personal injury.



WARNING

The number within the red circle corresponds to the instruction with the same number and must be followed exactly.



CE compliance and EMC

All INCLINEO components fulfil the EC Guidelines for electric devices and those relating to electromagnetic compatibility (2004/108/EC).

IP classification

INCLINEO and related components are water and dust resistant (IP65). (dust-tight and protected against immersion).

Storage

When not in use, store INCLINEO in such a manner that the display lies in parallel with the red handle and the mounting base. Also ensure that the display axis remains horizontal within +/- 5°. INCLINEO should be stored at temperatures between 15° and 30° C. These measures should prevent against premature damage of the high precision electronic inclinometer.

Note regarding data storage

With any data processing software, data may be lost or altered under certain circumstances. PRÜFTECHNIK strongly recommends that you keep a backup or printed records of all important data.

PRÜFTECHNIK assumes no responsibility for data lost or altered as a result of improper use, repairs, defects, battery replacement/failures or any other cause.

PRÜFTECHNIK assumes no responsibility, directly or indirectly, for financial losses or claims from third parties resulting from the use of this product and any of its functions, such as loss or alteration of stored data.



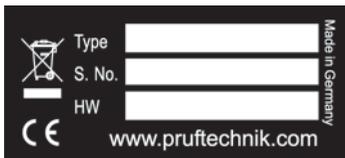
Note

Service and care

Although INCLINEO is essentially maintenance free, the calibration accuracy of the system should be checked every six months as indicated by the calibration label (see below) located on the back of the rotatable inclinometer assembly.

Component labelling

The labels shown below are to be found on INCLINEO.



The above label is affixed on the back of INCLINEO and shows the part and serial number of the system and the hardware version.

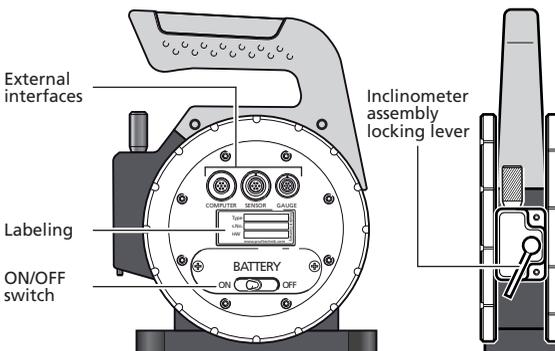
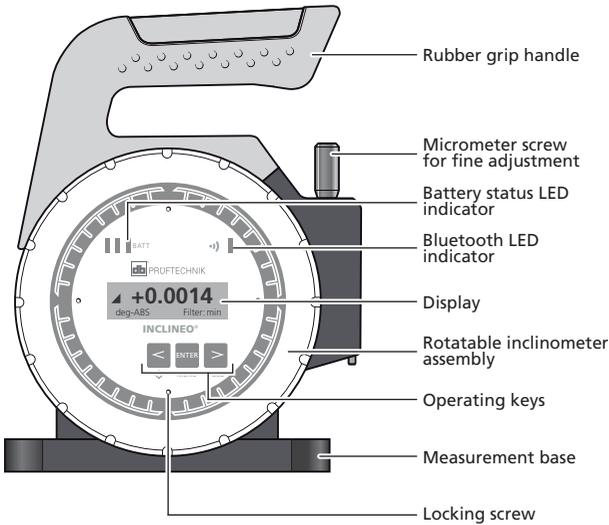


The calibration label is affixed on the back of INCLINEO and shows the date of the next scheduled calibration.

Getting started

Getting to know INCLINEO, the high precision inclinometer

Important parts of INCLINEO



Description of INCLINEO parts

- › Rubber grip handle – To improve flexibility for measurement, the handle may be detached from the assembly and rotated through 180°. This is readily achieved by undoing the two hex socket screws on the base of the handle. The socket screws are loosened or fastened using the provided 3 mm allen key.
- › Micrometer screw gauge – Used for fine adjustment during the set-up procedure. It is recommended to try and have the red marking on the screw gauge positioned in the middle of the slot.
- › Battery status LED indicator – This constitutes 3 LED bars to indicate the INCLINEO battery capacity.

The 3 LED bars operate as a graph to indicate the battery capacity from 100% where all three are lit continuously to low capacity of under 25% where only a single LED bar blinks fast. In this case, the battery operating time is in a critical phase and measurements should not be take.

The operating time may vary significantly depending on the type of batteries used. Normally, alkaline AA-size batteries are used.



Note

- › Bluetooth LED indicator – Used to indicate whether the system's wireless communication is on or off. When wireless communication is turned on, the Bluetooth LED bar blinks slowly.
- › Display – All set-up, measurement and menu items are shown on the display. The display's backlight may be turned on to illuminate the screen.
- › Rotatable inclinometer assembly – The assembly houses the high precision inclinometer. By being rotatable, it provides the flexibility to measure virtually any inclination.
- › Operating keys – The operating keys are used for a variety of functions which include: calling up and cycling through menu items, turning the display backlight on or off, freezing any indicated value.
- › Measurement base – The measurement base is changeable to suit the type of surface being measured. Three different types of bases are available.
- › External interfaces – Three ports for direct connection to a PC or a sensor or a measurement gauge are available on the back of INCLINEO. Presently, the sensor and measurement gauge ports are dedicated to marine applications.
- › Battery compartment – The compartment is opened using a Phillips screw driver. Remove the compartment to replace the 2 AA-size batteries.

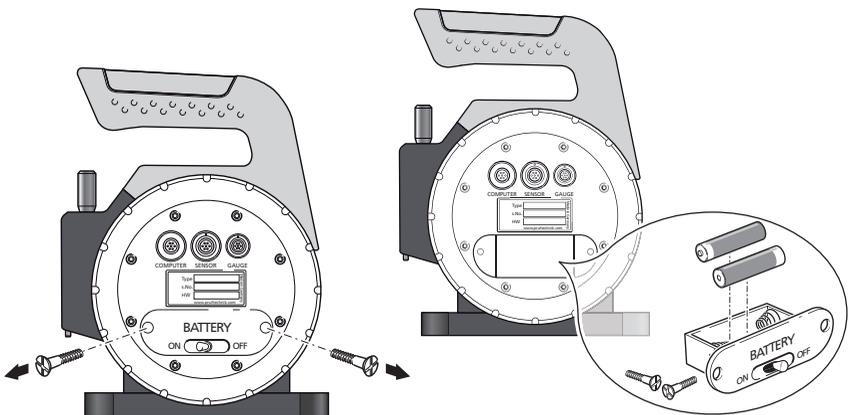
- › The on/off switch is part of the battery compartment.
- › Labelling – Two labels are affixed to the back of INCLINEO. One shows the date when calibration is due and the other shows the article number, the INCLINEO serial number and the version of the hardware.
- › Inclinator assembly locking lever – The lever is used to fasten the rotatable assembly. The assembly is rotated only when the lever is loose. To lock the assembly, the lever is turned to the left (as viewed from the side) with a small amount of force. When the lever is in the “lock” position, the micrometer screw gauge must never be turned.

Powering INCLINEO

INCLINEO is powered using 2 standard AA size alkaline batteries contained in the battery compartment. It is recommended that both batteries be replaced at the same time when only a single battery status LED bar blinks quickly.

Replacing batteries

Undo the two Phillips screws. With the screws loosened, hold and pull out the battery compartment. The reverse procedure is used to reinstall the battery compartment. Note the battery polarity when inserting them in the compartment.



Understanding menu items

Always remember that the INCLINEO on/off switch is located on the back of the system.



Note

After turning INCLINEO on, the software version number appears on the display followed by a value displaying the inclination in which the inclinometer finds itself in the current state. The value is a relative measurement denoted by "REL".



Press **ENTER** to reveal available INCLINEO menu items. Use **>** or **<** to cycle through the main INCLINEO menu items. The following menu items are available:

- ▶ Relative measurement
- ▶ Absolute measurement
- ▶ Filter
- ▶ Units
- ▶ Memory
- ▶ Backlight
- ▶ RF module
- ▶ Device info

Relative measurement

This is the first menu item that appears.



Pressing **ENTER** while in "Relative Meas" reveals the submenu items. Use **>** or **<** to cycle through the available submenu items. Press **ENTER** to confirm selection of the currently displayed submenu item.



Used to show the true inclination of the inclinometer

Relative Meas
set zero

Used to set the displayed value to zero

Relative Meas
edit

Used to edit the angular offset value

Relative Meas
exit

Used to exit the "Relative Meas" menu

The "Relative measurement" menu is exited by pressing **ENTER** with "exit" displayed. The next menu item is accessed by pressing **ENTER** to display the first menu item (Relative Meas), followed by **>**.

Absolute measurement

This is the next menu item that appears after pressing **>**.

< Absolute Meas >

This menu item is used to set the absolute measurement mode. Readings taken after this mode has been activated are absolute inclination values.

Type of filter

Pressing **ENTER** while in "Filter" reveals the submenu items. Use **>** or **<** to cycle through the available submenu items. Press **ENTER** to confirm selection of the currently displayed submenu item.

Filter
mid

When selected, readings acquire an average smoothing

Filter
max

When selected, maximum smoothing is applied to the readings



When selected, the filtering process is turned off and no smoothing is applied to the reading



When selected, minimum smoothing is applied to the readings

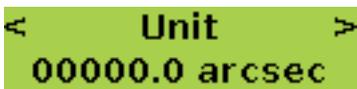


Used to exit the "Filter" menu

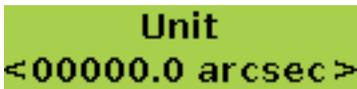
The "Filter" menu is exited by pressing **ENTER** with "exit" displayed. The next menu item is accessed by pressing **ENTER** to display the first menu item (Relative Meas), followed by **>** or **<** repeatedly.

Measurement units

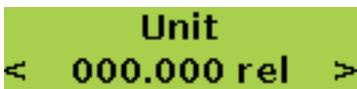
This menu item is used to select desired measurement unit.



Pressing **ENTER** while in "Unit" reveals the submenu items. Use **>** or **<** to cycle through the available submenu items. Press **ENTER** to confirm selection of the currently displayed submenu item.



Used to select the measurement unit "arcsecond".
1 arcsecond = 1" = 1/60 of an arcminute = 1/3600 of a degree



Used to select the measurement unit "rel" which is based on the relative base length of the given surface. The displayed value is a height.



Used to select the measurement unit "milliradian".
1 milliradian = 0.001 radian [rad is a unit of angular measure equal to the angle subtended at the centre of a circle by an arc equal in length to the radius of the circle = $180 / \pi = 57.3^\circ$ (app.)]

Unit
 ^ 000000 urad v

Used to select the measurement unit "microradian" =
 1/1000 of a milliradian

Unit
 ^ 00.0000 deg v

Used to select measurement unit "degrees" up to 4
 decimal places

Unit
 ^ 00.000 deg v

Used to select measurement unit "degrees" up to 3
 decimal places

Unit
 ^ 00.0000 gon v

Used to select the measurement unit "gon".
 1 gon = $\pi / 200$ radian. Gon is also called grade or
 new degree. Every new degree is divided into 100 new
 minutes and every new minute into 100 new seconds

Unit
 ^ 000.000 mm/m v

Used to select the measurement unit "millimetre /
 metre"

Unit
 ^ 000.000 mils/" v

Used to select the measurement unit "mils / inch"

Unit
 ^ 0.00000 "/10" v

Used to select the measurement unit "inch / 10 inches"

Unit
 ^ 00° 00' 00" v

Used to select the measurement unit "degrees - minutes
 - seconds"

Unit
 ^ exit v

Used to exit the "Unit" menu

The "Unit" menu is exited by pressing **ENTER** with "exit" displayed. The next menu item is accessed by pressing **ENTER** to display the first menu item (Relative Meas), followed by **>** or **<** repeatedly.

Memory

This menu item is used to save measurements taken.



This display shows that 12 of the available 999 memory slots have data stored in them.

Pressing **ENTER** while in "Memory" reveals the submenu items. Use **>** or **<** to cycle through the available submenu items.



Used when measurement data is to be stored manually

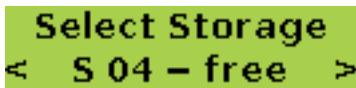
To store measurement data manually, press **ENTER** with the submenu item "manual" displayed. The selection of the data storage location is prompted as shown below.



The display indicates that measurements exist in storage location S 01.

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Use **>** to cycle through the storage locations. INCLINEO saves up to 999 measurements. Measurements may be stored in locations S 01 – S10. The data storage system is such that any one location is able to store the maximum 999 measurements. As the maximum number of measurements that may be stored in INCLINEO is 999, this implies that it would therefore not be possible to store any other measurement in the other storage locations.



This display shows that presently, no measurements have been saved in storage location S 04.

After selecting the storage location to be used, press **ENTER**. The display as shown below appears.



Press **>** (HOLD) to take and save the measurement or press **ENTER** to exit.

The LCD display shows the measurement value **-2.652**, the mode **rel**, and the status **measuring .**

After the measurement has taken place, the display below appears indicating that the measurement has been saved in the selected storage location.

The LCD display shows the measurement value **-2.605**, the mode **rel**, and the status **ok v**.

The 3 options available after measurement are "ok", "retry" and "exit". The required option is selected using **>** or **<**, then confirmed by pressing **ENTER**.

- ▶ When "ok" is selected and confirmed, the measurement is saved.
- ▶ When "retry" is selected and confirmed, measurement is repeated.
- ▶ When "exit" is selected and confirmed, measurement is abandoned.

The memory submenu item "auto" is used for the automatic recording and saving of a definite number of measurements. The submenu item is accessed using **>** or **<** while in "Memory".

The LCD display shows the menu item **Memory auto v**.

With "auto" displayed, press **ENTER**. The selection of the data storage location is prompted as shown below.

The LCD display shows the submenu item **S 01 - used v**.

Use **>** or **<** to cycle through the storage locations. Select measurement storage location by pressing **ENTER**. This prompts the display of number of readings to be taken.

The LCD display shows the submenu item **010 v**.

The number of readings to be taken then saved is set using **>** or **<**. After setting number of readings required, press **ENTER**. The duration for each measurement is then prompted as shown below.



Set the duration for each measurement using **>** or **<**. Press **ENTER** to confirm setting the duration. The following screen appears.



The bottom right corner of the display shows the currently selected storage location [04] and number of measurements presently stored in the location [000].

Press **>** [HOLD] to start taking and saving set measurements.



This display shows the current storage location [05] and number of measurements already stored in the location [016].

If a storage location has previously been used, it is important to note the number of measurements previously saved in the location, as new measurements are recorded successively. This is important when viewing saved measurements. In the preceding example, the next measurement will appear as number 017.



Note

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The taken and saved measurements may be displayed using the memory submenu item "view" which is accessed as described at the beginning of this section (Memory).



Press **ENTER** with "view" displayed. The selection of the data storage location is prompted. Use **>** to select the location where measurements to be viewed have been saved.



Press **ENTER** to open the measurement storage location.

```

-0002.605 rel
^  04-001  v
  
```

Use **>** or **<** to cycle through the saved measurements.

Backlight

This menu item is used to control the display backlight.

```

^  Backlight  v
   off
  
```

Pressing **ENTER** while in "Backlight" reveals the submenu items. Use **>** or **<** to cycle through the available submenu items. Press **ENTER** to confirm selection of the currently displayed submenu item.

```

^  Backlight  v
   on
  
```

Used to switch the display backlight on

```

^  Backlight  v
   auto-off 30s
  
```

When selected, the backlight switches off automatically after 30 seconds

```

^  Backlight  v
   auto-off 5min
  
```

When selected, the backlight switches off automatically after 5 minutes

```

^  Backlight  v
   off
  
```

Used to switch the display backlight off

```

^  Backlight  v
   exit
  
```

Used to exit the "Backlight" menu

The "Backlight" menu is exited by pressing **ENTER** with "exit" displayed. The next menu item is accessed by pressing **ENTER** to display the first menu item (Relative Meas), followed by **>** or **<** repeatedly.

RF module

This menu item is used to turn wireless communication on or off.



Pressing **ENTER** while in "RF Module" reveals the submenu items. Use **>** or **<** to cycle through the available submenu items. Press **ENTER** to confirm selection of the currently displayed submenu item.



Used to establish wireless communication to a PC. When selected the Bluetooth LED blinks



Used to turn wireless communication off



Used to exit the "RF Module" menu

The "RF Module" menu is exited by pressing **ENTER** with "exit" displayed. The next menu item is accessed by pressing **ENTER** to display the first menu item (Relative Meas), followed by **>** or **<** repeatedly.

The RF module complies with the conducted and radiated emission limits of FCC rules part 15.247.



Note

Device info

This menu item is used to display the device serial number, the firmware and hardware versions.



With "Device Info" displayed, press  to display the first device information. Use  or  to cycle through the available device information.

```
Device Info
< SN: 07363020 >
```

Device serial number is displayed

```
Device Info
< SW Ver: 2.02 >
```

Firmware version is displayed

```
Device Info
< HW Ver: 2.00 >
```

Hardware version is displayed

```
Device Info
^      exit      v
```

Used to exit the "Device Info" menu

Measurement methods

Absolute measurement

This method is used to determine the exact or absolute inclination of the surface being measured.

To carry out absolute inclination measurements, INCLINEO needs to be levelled. For high precision, the measurement process demands that the object to be measured and INCLINEO be at the same temperature. The surface where the level condition is to be set must be relatively even and rigid.

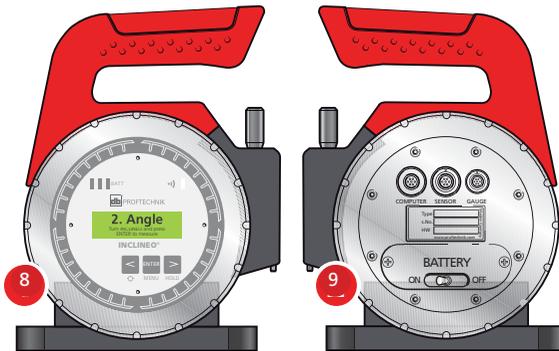
1. Place INCLINEO on the object to be measured and switch it on. The active measurement is displayed.
2. Set the displayed value as close to zero as possible. Use the rotating inclinometer assembly and the micrometer screw.
3. Press **ENTER** to access the menu, then press **>** or **<** to select the menu item "Absolute Meas".



4. With "Absolute Meas" appearing on the display, press **ENTER**. The message "1. Angle Press ENTER to measure" appears on the display.
5. Press **ENTER** to start measuring.
6. As soon as the measurement has stabilized, "ok" appears on the display below the registered value.
7. Press **ENTER** to accept reading. The message "2. Angle Turn INCLINEO and press ENTER to measure" appears on the display.



8. With INCLINEO still in its original position, mark the current location to enable INCLINEO be placed at exactly the same position for the reversal measurement.
9. Now rotate INCLINEO through 180°.
10. Align INCLINEO into place then press **ENTER** to start second measurement.
11. After measurement has stabilized “ok” appears on the display. The system has now been set for absolute measurements.
12. Press **ENTER** to confirm setting the level condition.
13. With the submenu item “save” displayed, press **ENTER** to save the set-up. Readings taken henceforth are absolute values.



For the second reading, INCLINEO is rotated through 180° and placed at exactly the same position as in the first reading



Relative measurement

It may be necessary to know the relative inclination of different surfaces. This is carried out using the relative measurement method.

1. Place INCLINEO on the selected reference surface and switch the system on.

It is recommended that the displayed value be set as close to zero as possible. You may use the rotating inclinometer assembly and the micrometer screw.



Note

2. Press **ENTER** to access the menu items. "Relative Meas" appears on the display (if not use **>** or **<** to select it).
3. Press **ENTER** to access the submenu items.
4. Use **>** or **<** to select "set zero".
5. Press **ENTER** to proceed to set the reference value.
6. After measurement, the collected value is displayed. Readings taken henceforth are relative to the reference value.



Measuring wide angles

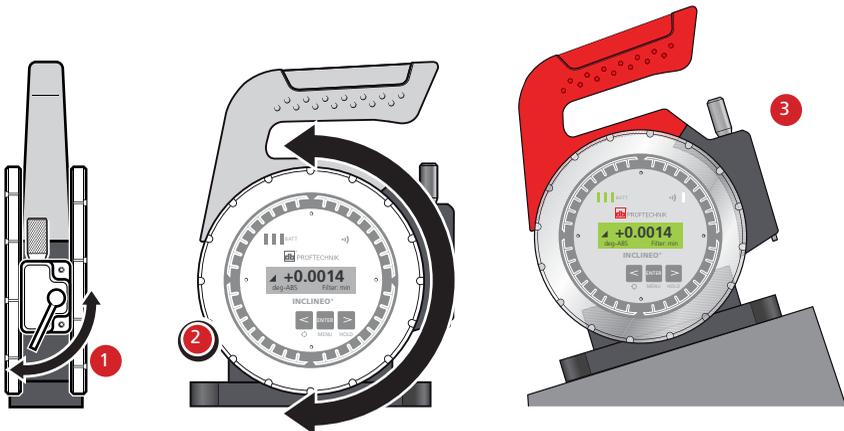
It may be necessary to measure surface inclinations that are larger than the inclinometer capacity of 10°. Such measurements are carried out using the relative measurement method, and are made possible by the system's rotatable inclinometer assembly. If INCLINEO is placed on a surface with an inclination greater than 10° and turned on, "overflow" is registered on the display.



The rotatable INCLINEO housing allows high precision measurements on surfaces with steep inclination.

In order to carry out relative measurements the rotatable assembly needs to be rotated to display a near zero value.

1. To rotate the assembly, loosen it by rotating the locking lever anti-clockwise.
2. The assembly can now be freely rotated.
3. Use the micrometer adjustment screw to attain the near zero value. The nearer to zero the higher the accuracy of measurement results.



4. After attaining a near zero value, press **ENTER** then use **>** or **<** to select "Relative Meas".
5. Press **ENTER** to access the submenu items and use **>** or **<** to select "set zero".
6. Press **ENTER** to confirm selection.

After set-up is completed, the inclinometer assembly must never be rotated. All related measurements must be taken using only this set-up.

**Note**

7. Now proceed to carry out relative measurements.
In this configuration, the system can be used to measure the relative inclination of surfaces with any inclination with an increased accuracy.

INCLINEO ALIGNMENT CENTER PC software

Before using the INCLINEO ALIGNMENT CENTER PC software please familiarize yourself with the ALIGNMENT CENTER PC software. Information relating to this software can be found in the ALIGNMENT CENTER File Manager and Flatness manuals which are available from your local PRÜFTECHNIK Alignment Systems representative.

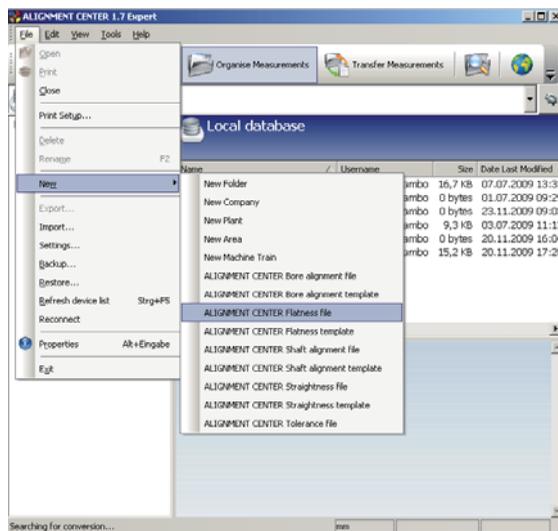


Note

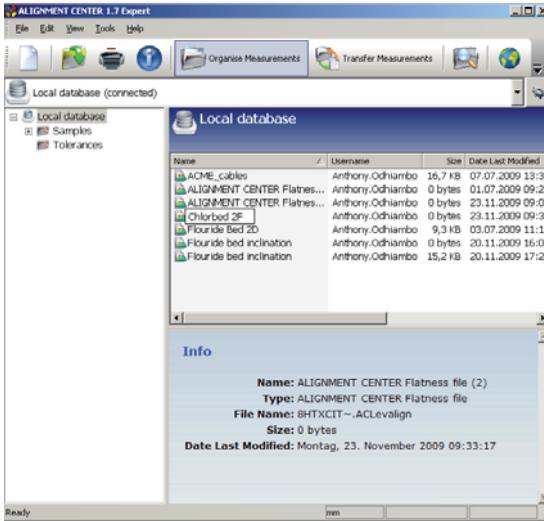
The INCLINEO ALIGNMENT CENTER PC software may be used to determine straightness and flatness profiles of surfaces.

Creating a measurement file

1. After starting ALIGNMENT CENTER, select "File">"New">"ALIGNMENT CENTER flatness file".



- Right-click the mouse with the cursor on the file name. Select "Rename" from the pop-up menu that appears. Proceed to edit file name as appropriate.

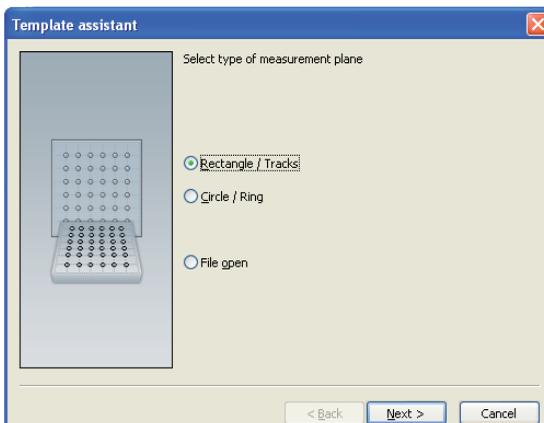


- Double-click the file name to open the file. The template assistant appears.

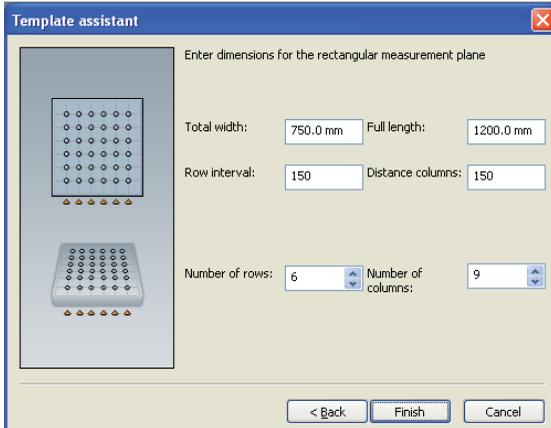
The template assistant will not appear if the file has already been configured. In this case, the dimension screen will appear.



Note

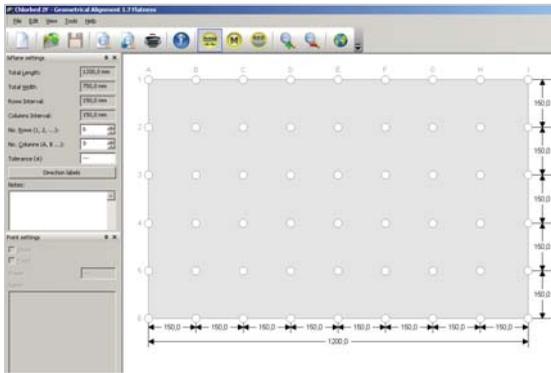


- Use the template assistant to configure file as necessary.



Note that the distance between the columns must be equivalent to the length of the mounting base.

- When file configuration is completed, click the "Finish" button. The dimension screen showing the configured grid appears.

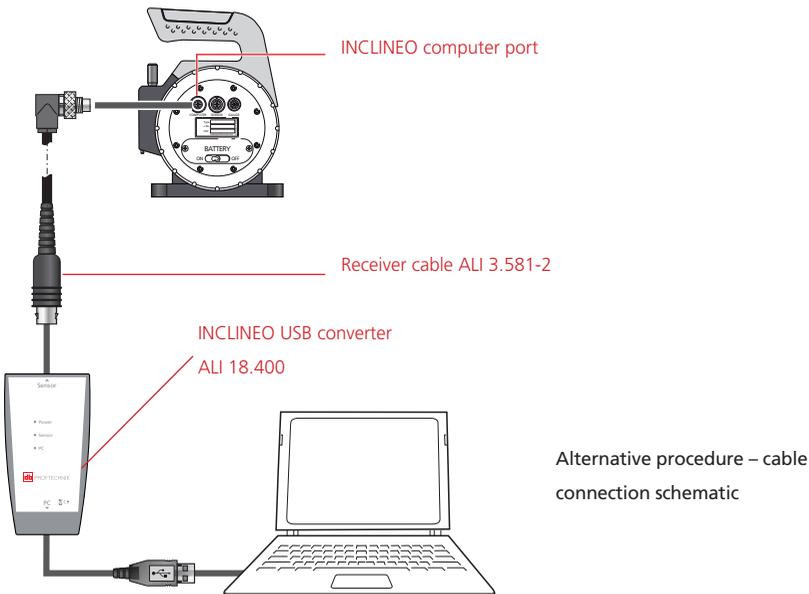
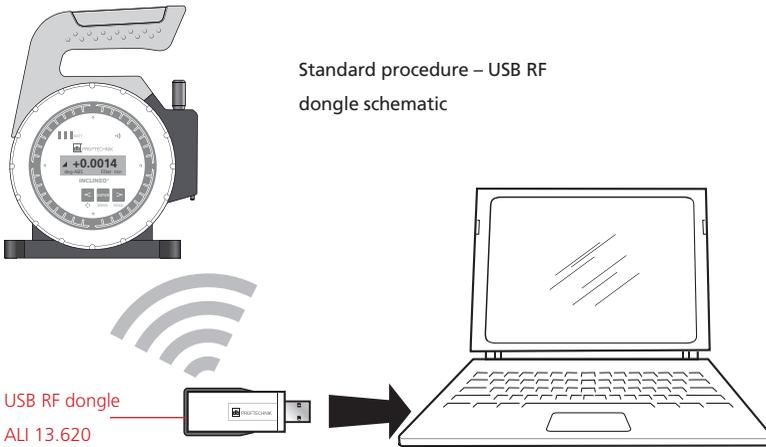


- You are now ready to start taking measurements.

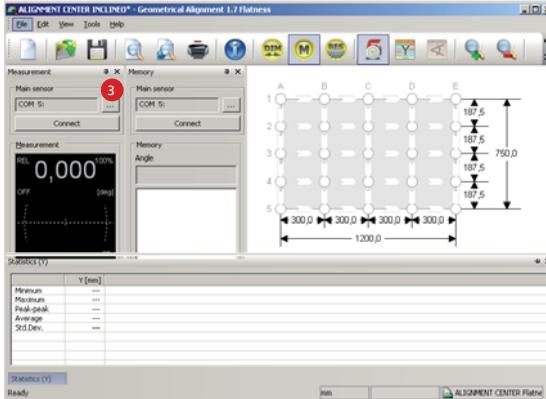
Taking measurements

- Switch INCLINEO on and set the necessary measurement options as described in previous chapters.

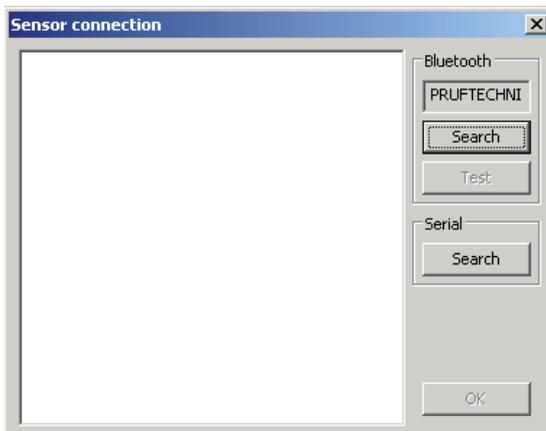
- ▶ Measurements are taken wireless using the USB RF dongle ALI 13.620. See schematic below.
- ▶ Alternatively use the cable combination which includes the receiver cable ALI 3.581-2 and the INCLINEO USB converter ALI 18.400. If using the cable combination, please refer to the cable connection diagram below.



2. Click the 'Measurement' icon followed by the INCLINEO icon on the button bar.



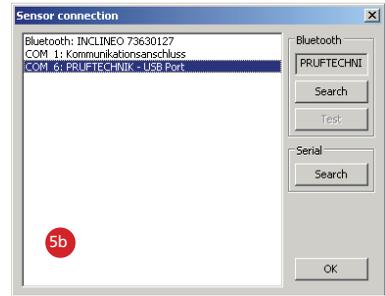
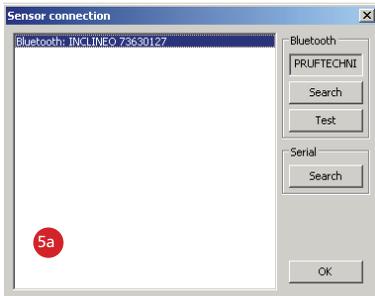
3. Click the search button (3) located on the 'Main sensor' frame. The 'Sensor connection' display appears.



On clicking the search button marked (3) above, the message 'PRUFTECHNIK' should appear in the box below 'Bluetooth' as shown opposite. This indicates that the USB RF dongle has been detected.

4. Click the Bluetooth search button to scan the neighbourhood for INCLINEO Bluetooth.
However, when using the cable combination, click the serial port search button.

- If INCLINEO Bluetooth is detected, its serial number is displayed. If using the cable combination, "PRUFTECHNIK - USB Port" will be displayed.

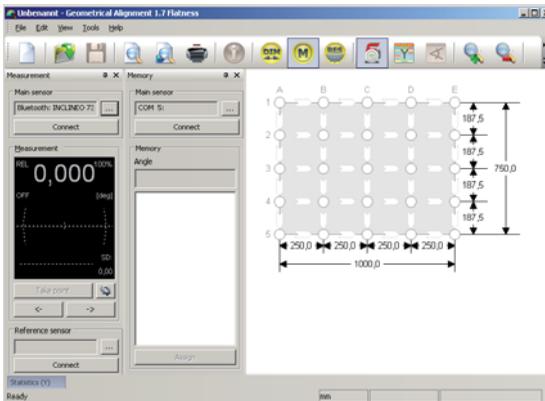


In example 5a, wireless communication via Bluetooth has been selected. In 5b the cable combination has been used.

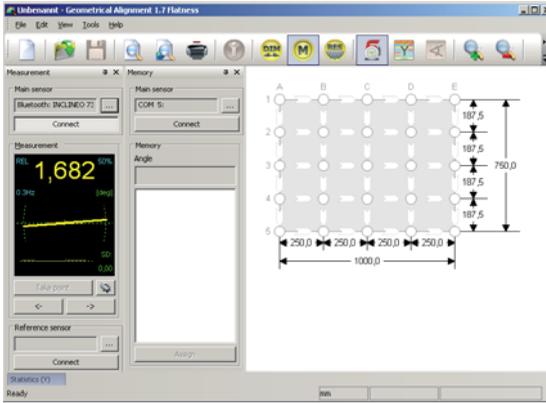


Note

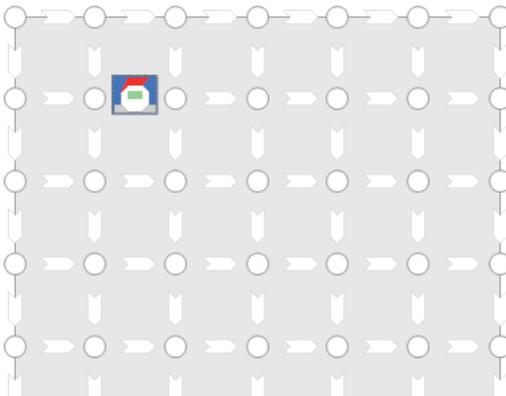
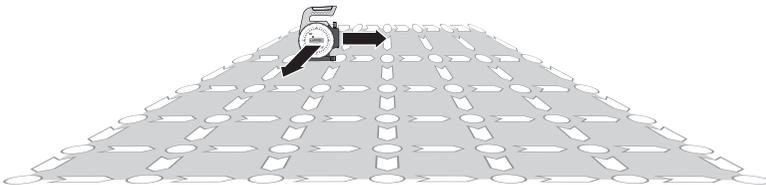
- Depending on method used, click either the displayed serial number or "PRUFTECHNIK - USB Port" then the 'OK' button. This information is then transferred to the 'Main sensor' information box.



- Complete Bluetooth/cable connection by clicking the 'Connect' button in the 'Main sensor' frame.

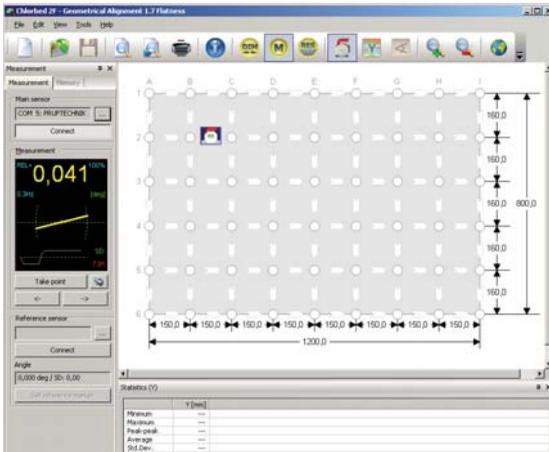


- Place INCLINEO on the grid marked on the surface to be measured. Place INCLINEO so that the red tip of the handle points in the direction that measurement will be carried out with the display in view. The direction of measurement is clearly shown with the INCLINEO ALIGNMENT CENTER PC software.

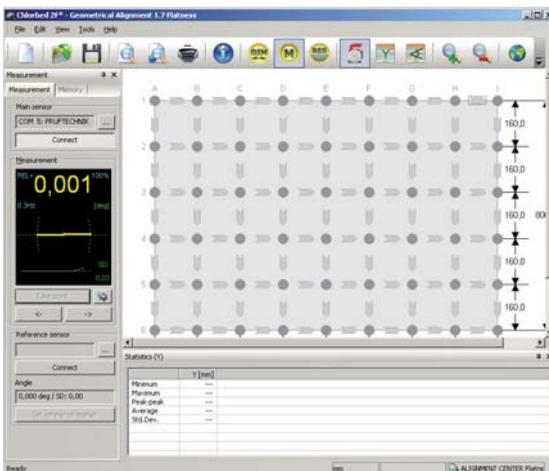


The direction of INCLINEO on the grid may be changed using a right mouse click. Note: INCLINEO right mouse direction change is not recommended and if at all used, measurement should be only in absolute measurement mode.

- With INCLINEO correctly placed on the location to be measured, click the corresponding position on the INCLINEO ALIGNMENT CENTER measurement screen.



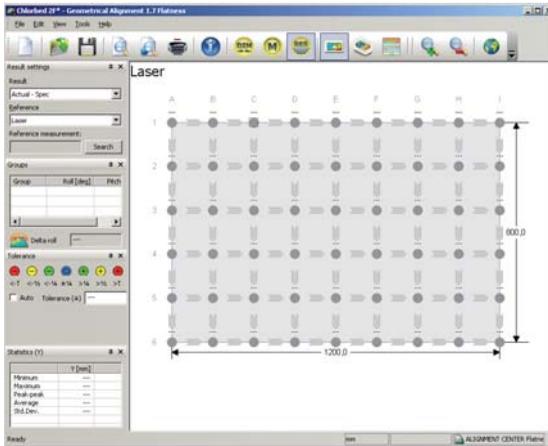
- Allow the measurement to settle. This is indicated by the standard deviation value. As soon as a stable value is attained, click the "Take point" button to take measurement. The recorded value takes the two adjacent points within an axis into consideration.
- Repeat steps 8 through to 10 for all necessary measurement points progressing through the grid in the specified direction.



The taken measurement points appear in grey.

Evaluating results

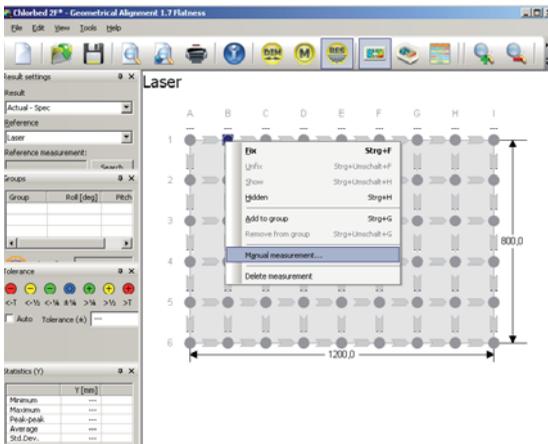
After measurement has been completed, click the 'Results' icon to evaluate the results.



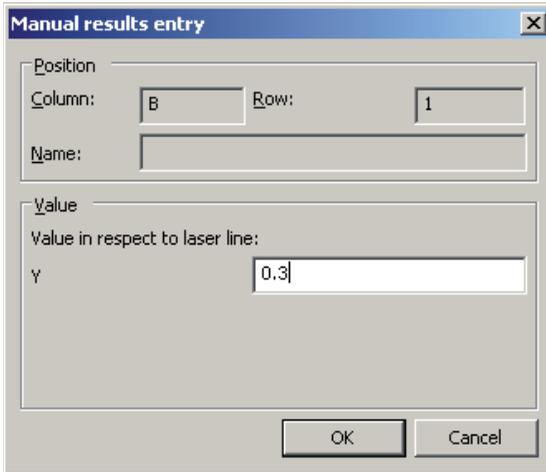
All positions where measurement has been taken appear grey but results cannot be displayed due a missing reference value. The value is entered as described below.

To be able to interpret measurement results, any one single measurement point within the grid has to be assigned a specific value. This arbitrary value is used to convert the angles measured into a height measurement. To enter the value, proceed as follows.

1. Right-click the chosen measurement point. A pop-up menu appears.

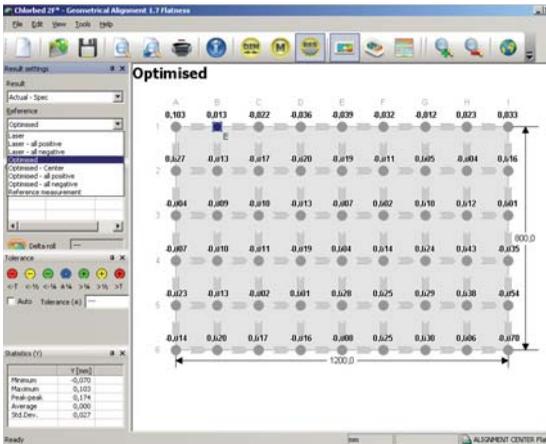


2. Click the menu item 'Manual measurement'. Enter the arbitrary value in the value box marked Y. This value could be the actual height/depth of the selected measurement point.

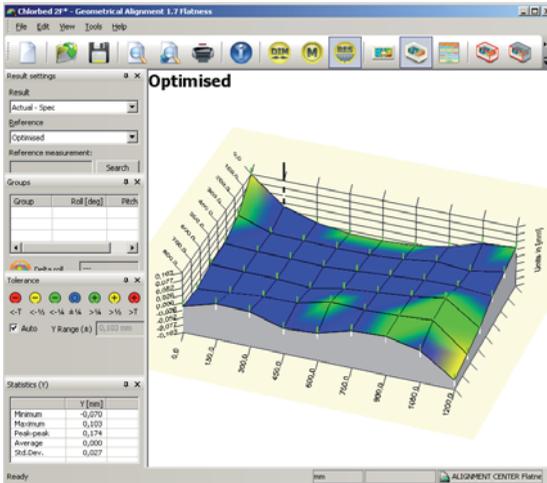


The reference value of 0.3 is entered at point B1.

3. Click the 'OK' button to integrate the value into the measurement.



After the arbitrary value has been entered (2) above, the results may be displayed in 2D and 3D formats.



Using a Bluetooth-enabled PC for INCLINEO connectivity

PRÜFTECHNIK Alignment Systems recommends use of the USB RF dongle ALI 13.620 for Bluetooth connectivity between a PC and INCLINEO. If using a PC with Bluetooth capabilities, the PC Bluetooth Manager is used to acquire wireless connectivity.

In such instances, the 'Authentication Request' window will appear. Enter the pin code "blue".



Note



Appendix to INCLINEO ALIGNMENT CENTER software

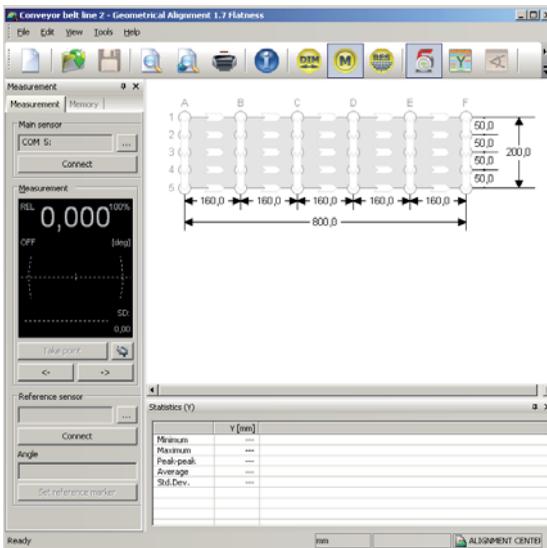
This appendix provides information about certain aspects of the PC software that may not be regularly applied but may prove useful to the user.



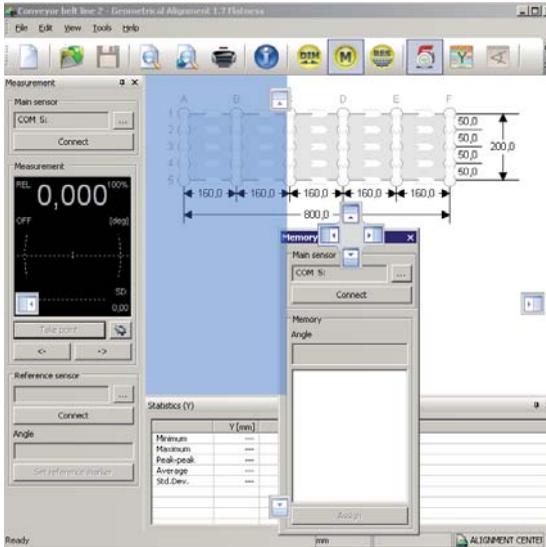
Note

Default measurement screen

The screen below shows the default configuration of the measurement screen when the INCLINEO function is selected.

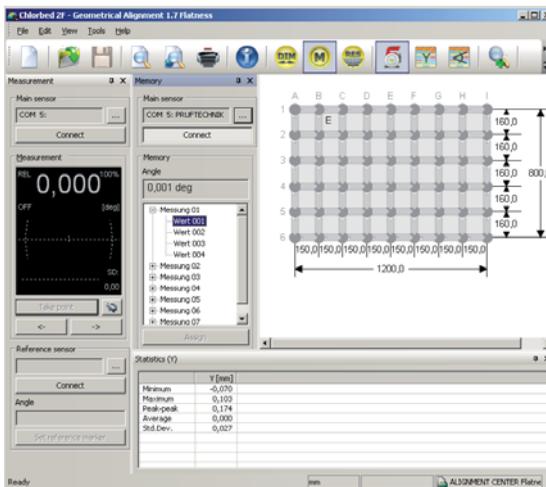


In the default configuration, the 'Measurement' and 'Memory' panes overlap. The panes may be positioned at any selected location by clicking the appropriate tab and holding the mouse down. The panes may be docked at the positions that turn light blue when the cursor goes over the respective docking guide.



In this example, the 'Memory' pane can be dragged to the location highlighted light blue and docked by releasing the mouse button.

Memory pane

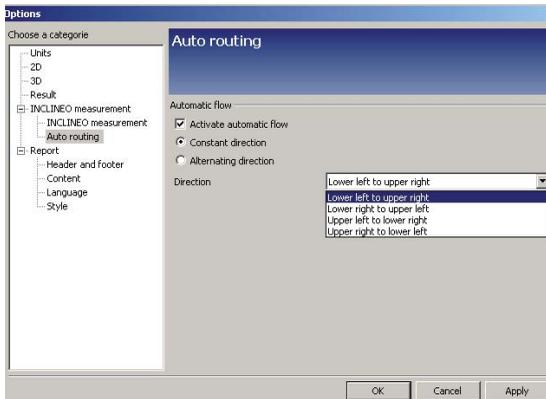


All measurements stored in INCLINEO are displayed in the 'Memory' pane. In this example, the first measurement value stored is storage location 1 is displayed in the 'Angle' box. The value stored was 0.001°.

The memory pane is used to display all measurements that have been stored in INCLINEO. To display the readings, follow steps 1-7 as described in 'Taking measurements' starting on page 31. However use only the buttons on the 'Memory' pane. When connection is established, the message "Successfully connected" appears in the 'Angle' box.

Auto-routing

The auto-routing function enables the intelligent and automatic selection of the next measurement point. Auto-routing can be activated at anytime. To activate auto-routing select 'Tools'>'Options'>'Auto-routing'.



The 'Direction' drop down menu shows the available turn-by-turn directions.

Auto-routing is activated by checking the 'Activate automatic flow' box, and can be further defined in terms of the turn-by-turn directions.

A1	A2	A3	A4
B1	B2	B3	B4

- ▶ Constant direction implies that measurement will always be taken in the same direction:
A1 → A2 → A3 → A4 → B1 → B2 → B3 → B4
- ▶ Alternating direction implies that measurement direction can be changed:
A1 → A2 → A3 → A4 → B4 → B3 → B2 → B1

INLINEO technical data

INLINEO high precision inclinometer ALI 18.201

Measurement range	±10°
Resolution	0.0003° [1"]
Limits of error at calibration [Ta =22°C]	0.005% full scale 0.03% read out
Limits of error at measurement [Ta =22°C]	0.005% full scale 0.06% read out
8-hour zero-point drift	0.04% full scale
Digital Filter/Average	3rd order with 0.3 / 1 / 3 Hz options
Temperature range	Storage: -40°C to 85°C Operation: -10°C to 60°C
Display	LCD display, 132 x 32 pixel with LED backlight
User interface	Three key operation
Wireless communication	Embedded RF module with LED indicator
External interface	RS-232 (serial) for computer and sensor Connector for dial gauge
Power supply	2 AA batteries
Battery status indicator	3 LEDs
Data storage	Up to 999 measurements
Integrated RF module	Antenna – integrated Transmission power – 20 dB max. Complies with part 15 of the FCC rules. Operation is subject to following conditions: - Device must not cause harmful interference - Device must accept any interference received, including interference that may cause undesired operation This transmitter is considered as mobile device and should not be used closer than 20 cm from a human body. Contained transmitter module — FCC ID: POOWML-C40 / CE: CE0678①

USB RF dongle ALI 13.620

PC interface	USB 2.0 compatible
Temperature range	-40° C to 85° C
Dimensions	68 x 25 x 13 mm
Antenna	Integrated
Transmission power	19 dBm
Details	Complies with part 15 of the FCC rules. Operation is subject to following conditions: - Device must not cause harmful interference - Device must accept any interference received, including interference that may cause undesired operation This transmitter is considered as mobile device and should not be used closer than 20 cm from a human body. Contained transmitter module — FCC ID: QQQWT41 / IC: 5123A-BGTWT41

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